

**DEPARTMENT OF PHYSICS**  
**GOVT. V.Y.T. PG. AUTONOMOUS COLLEGE DURG**

**B.Sc. -I**

**BPH01: MECHANICS, OSCILLATIONS AND PROPERTIES OF MATTER**

**UNIT-1**

Cartesian, Cylindrical and Spherical coordinate system, Inertial and non-inertial frames of reference, uniformly rotating frame, Coriolis force and its applications. Motion under a central force, Kepler's laws. Effect of Centrifugal and Coriolis forces due to earth's rotation, Center of mass (C.M.), Lab and C.M. frame of reference, motion of C.M. of system of particles subject to external forces, elastic, and inelastic collisions in one and two dimensions, Scattering angle in the laboratory frame of reference, Conservation of linear and angular momentum, Conservation of energy.

**UNIT-2**

Rigid body motion, rotational motion, moments of inertia and their products, principal moments & axes, introductory idea of Euler's equations. Potential well and Periodic Oscillations, case of harmonic small oscillations, differential equation and its solution, kinetic and potential energy, examples of simple harmonic oscillations: spring and mass system, simple and compound pendulum, torsional pendulum.

**UNIT-3**

Bifilar oscillations, Helmholtz resonator, LC circuit, vibrations of a magnet, oscillations of two masses connected by a spring. Superposition of two simple harmonic motions of the same frequency, Lissajous figures, damped harmonic oscillator, case of different frequencies. Power dissipation, quality factor, examples, driven (forced) harmonic oscillator, transient and steady states, power absorption, resonance.

**UNIT-4**

E as an accelerating field, electron gun, case of discharge tube, linear accelerator, E as deflecting field- CRO sensitivity, Transverse B field, 180° deflection, mass spectrograph, curvatures of tracks for energy determination, principle of a cyclotron. Mutually perpendicular E and B fields: velocity selector, its resolution. Parallel E and B fields, positive ray parabolas, discovery of isotopes, elements of mass spectrography, principle of magnetic focusing lens.

**UNIT-5**

Elasticity: Strain and stress, elastic limit, Hooke's law, Modulus of rigidity, Poisson's ratio, Bulk modulus, relation connecting different elastic- constants, twisting couple of a cylinder (solid and hollow), Bending moment, Cantilever, Young modulus by bending of beam.

Viscosity: Poiseulle's equation of liquid flow through a narrow tube, equations of continuity. Euler's equation, Bernoulli's theorem, viscous fluids, streamline and turbulent flow. Poiseulle's law, Coefficient of viscosity, Stoke's law, Surface tension and molecular interpretation of surface tension, Surface energy, Angle of contact, wetting.

**TEXT AND REFERENCE BOOKS:**

1. E M Purcell, Ed Berkely physics course, vol. Mechanics (Mc. Gr. Hill) R P Feynman.
2. R B Lighton and M Sands, the Feynman lectures in physics, vol I (B) publications, Bombay, Delhi, Calcutta, Madras.
3. D P Khandelwal, Oscillations and waves (Himalaya Publishing House Bombay).
4. R. K. Ghosh, The Mathematics of waves and vibrations (Macmillan 1975).
5. J.C. Upadhyaya- Mechanics (Hindi and English Edition.)
6. D.S. Mathur- Mechanics and properties of matter.
7. Brijlal and Subramanium- Oscillations and waves. Resnick and Halliday- Volume I
8. Physics Part –1: Resnick and Halliday.

## B.Sc-I

### **BPH02: ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY**

**Note:- Numerical problems based on the topics must be asked in each unit.**

#### **Unit-1**

Repeated integrals of a function of more than one variable, definition of a double and triple integral. Gradient of a scalar field and its geometrical interpretation, divergence and curl of a vector field, and their geometrical interpretation, line, surface and volume integrals, flux of a vector field. Gauss's divergence theorem, Green's theorem and Stoke's theorem and their physical significance. Kirchoff's law, Ideal Constant-voltage and Constant-current Sources. Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem and Maximum Power Transfer theorem.

#### **Unit-2**

Coulomb's law in vacuum expressed in Vector forms, calculations of E for simple distributions of charges at rest, dipole and quadrupole fields. Work done on a charge in an electrostatic field expressed as a line integral, conservative nature of the electrostatic field. Relation between Electric potential and Electric field, torque on a dipole in a uniform electric field and its energy, flux of the electric field.

Gauss's law and its application: E due to (1) an Infinite Line of Charge, (2) a Charged Cylindrical Conductor, (3) an Infinite Sheet of Charge and Two Parallel Charged Sheets, capacitors, electrostatic field energy, force per unit area of the surface of a conductor in an electric field, conducting sphere in a uniform electric field.

#### **Unit-3**

Dielectric constant, Polar and Non Polar dielectrics, Dielectrics and Gauss's Law, Dielectric Polarization, Electric Polarization vector P, Electric displacement vector D. Relation between three electric vectors, Dielectric susceptibility and permittivity, Polarizability and mechanism of Polarization, Lorentz local field, Clausius Mossotti equation, Debye equation,

Ferroelectric and Paraelectric dielectrics, Steady current, current density J, non-steady currents and continuity equation, rise and decay of current in LR, CR and LCR circuits, decay constants, AC circuits, complex numbers and their applications in solving AC circuit problems, complex impedance and reactance, series and parallel resonance, Q factor, power consumed by an AC circuit, power factor.

#### **Unit-4**

**Magnetization Current and magnetization vector M, three** magnetic vectors and their relationship, Magnetic permeability and susceptibility, Diamagnetic, paramagnetic and ferromagnetic substances. B.H. Curve, cycle of magnetization and hysteresis, Hysteresis loss.

**Biot-Savart's Law and its applications:** B due to (1) a Straight Current Carrying Conductor and (2) Current Loop. Current Loop as a Magnetic Dipole and its Dipole

Moment (Analogy with Electric Dipole). Ampere's Circuital law (Integral and Differential Forms).

### **Unit-5**

**Electromagnetic induction**, Faraday's law, electromotive force, integral and differential forms of Faraday's law Mutual and self inductance, Transformers, energy in a static magnetic field. Maxwell's displacement current, Maxwell's equations, electromagnetic field energy density. The wave equation satisfied by E and B, plane electromagnetic waves in vacuum, Poynting's vector.

### **TEXT AND REFERENCE BOOKS:**

1. Berkeley Physics Course, Electricity and Magnetism, Ed. E.M. Purcell (Mc Graw - Hill).
2. Halliday and Resnik, Physics, Vol. 2.
3. D J Griffith, Introduction to Electrodynamics (Prentice-Hall of India).
4. Raitz and Milford, Electricity and Magnetism (Addison-Wesley).
5. A S Mahajan and A A Rangwala, Electricity and Magnetism (Tata Mc Graw-hill).
6. A M Portis, Electromagnetic fields.
7. Pugh & Pugh, Principles of Electricity and Magnetism (Addison-Wesley).
8. Panofsky and Phillips, Classical Electricity and Magnetism, (India Book House).
9. S S Atwood, Electricity and Magnetism (Dover).

**B.Sc-I**  
**BPHL01: LAB COURSE**

**LIST OF EXPERIMENTS**

**Minimum 16 (Eight from each group)**

Experiments out of the following or similar experiments of equal standard

**GROUP-A**

1. Study of laws of parallel and perpendicular axes for moment of inertia.
2. Moment of inertia of Fly wheel.
3. Moment of inertia of irregular bodies by inertia table.
4. Study of conservation of momentum in two dimensional oscillations.
5. Study of a compound pendulum.
6. Study of damping of a bar pendulum under various mechanics.
7. Study of oscillations under a bifilar suspension.
8. Study of modulus of rigidity by Maxwell's needle.
9. Determination of  $Y$ ,  $k$ ,  $\eta$  by Searl's apparatus.
10. To study the oscillation of a rubber band and hence to draw a potential energy curve from it.
11. Study of oscillation of a mass under different combinations of springs.
12. Study of torsion of wire (static and dynamic method).
13. Poisson's ratio of rubber tube.
14. Study of bending of a cantilever or a beam.
15. Study of flow of liquids through capillaries.
16. Determination of surface tension of a liquid.
17. Study of viscosity of a fluid by different methods

**GROUP-B**

1. Use of a vibration magnetometer to study a field.
2. Study of magnetic field  $B$  due to a current.
3. Measurement of low resistance by Carey-Foster bridge.
4. Measurement of inductance using impedance at different frequencies.
5. Study of decay of currents in LR and RC circuits.
6. Response curve for LCR circuit and response frequency and quality factor.
7. Study of waveforms using cathode-ray oscilloscope.
8. Characteristics of a choke and Measurement of inductance.
9. Study of Lorentz force.
10. Study of discrete and continuous LC transmission line.
11. Elementary FORTRAN programs, Flowcharts and their interpretation.
12. To find the product of two matrices.

13. Numerical solution of equation of motion.

14. To find the roots of quadratic equation.

15. To find the product of two matrices.

16. Numerical solution of equation of motion.

17. To find the roots of quadratic equation.

**TEXT AND REFERENCE BOOKS:**

1. B saraf et al Mechanical Systems(Vikas publishing House,New Delhi).
2. D.P. khandelwal, A Laboratory Manual of Physics for Undergraduate classes (Vani Publication House,New Delhi).
3. C G Lambe Elements of statistics (Longmans Green and Co London New York, Tprpnto).
4. C Dixon, Numerical analysis.
5. S Lipsdutz and A Poe, schaum's outline of theory and problems of programming with Fortran (MC Graw-Hill Book Company, Singapore 1986).

## B.Sc. Part-II

### BPH03: THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

#### Unit-1

The laws of thermodynamics: The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, Carnot's cycle, Carnot theorem, second law of thermodynamics. Clausius theorem inequality. Entropy, Change of entropy in simple cases (i) Isothermal expansion of an ideal gas (ii) Reversible isochoric process (iii) Free adiabatic expansion of an ideal gas. Concept of entropy, Entropy of the universe. Entropy change in reversible and irreversible processes, Entropy of Ideal gas, Entropy as a thermodynamic variable, S-T diagram, Principle of increase of entropy. The thermodynamic scale of temperature, Third law of thermodynamics, Concept of negative temperature.

#### Unit-2

Thermodynamic functions, Internal energy, Enthalpy, Helmholtz function and Gibbs free energy, Maxwell's thermodynamical equations and their applications,  $TdS$  equations, Energy and heat capacity equations Application of Maxwell's equation in Joule-Thomson cooling, adiabatic cooling of a system, Van der Waals gas, Clausius-Clapeyron heat equation. Blackbody spectrum, Stefan-Boltzmann law, Wien's displacement law, Rayleigh-Jean's law, Planck's quantum theory of radiation.

#### Unit-3

Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distinction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections. Estimates of molecular diameter and mean free path. Transport of mass, momentum and energy and interrelationship, dependence on temperature and pressure.

Behaviour of Real Gases: Deviations from the Ideal Gas Equation. The Virial Equation. Andrew's Experiments on CO<sub>2</sub> Gas. Critical Constants.

#### **Unit-4**

The statistical basis of thermodynamics: Probability and thermodynamic probability, principle of equal a priori probabilities, statistical postulates. Concept of Gibbs ensemble, accessible and inaccessible states. Concept of phase space,  $\gamma$  phase space and  $\mu$  phase space. Equilibrium between two systems in thermal contact, probability and entropy, Boltzmann entropy relation. Boltzmann canonical distribution law and its applications, law of equipartition of energy. Transition to quantum statistics: 'h' as a natural constant and its implications, cases of particle in a one-dimensional box and one-dimensional harmonic oscillator

#### **Unit-5**

Indistinguishability of particles and its consequences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics, Limits of B-E and F-D statistics to M-B statistics. Application of B-E statistics to black body radiation, Application of F-D statistics to free electrons in a metal.

#### **TEXT AND REFERENCE BOOKS:**

1. B.B. Laud, " Introduction to Statistical Mechanics" (McMillan 1981)
2. F. Reif: " Statistical Physics" (McGraw-Hill, 1998).
3. K. Huang: " Statistical Physics" (Wiley Eastern, 1988).
4. Thermal and statistical Physics: R.K. Singh, Y.M. Gupta and S. Sivraman.
5. Statistical Physics: Berkeley Physics Course, Vol. 5
6. Physics (Part-2): Editor, Prof. B.P. Chandra, M.P. Hindi Granth Academy.
7. Heat and Thermodynamics: K.W. Zeemansky.

8. Thermal Physics: B.K. Agarwal.
9. Heat and Thermodynamics: BrijLal and N. Subramanyam.
10. Heat and Thermodynamics: Dayal, Verma and Pandey.
11. A Treatise on Heat: M.N. Saha and B.N. Srivastava.

## B. Sc. Part-II

### **BPH04: WAVES, ACOUSTICS AND OPTICS**

#### **Unit-1**

Waves in media: Speed of transverse waves on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liquid surface: gravity waves and ripples. Group velocity and phase velocity and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications.

Reflection, refraction and diffraction of sound: Acoustic impedance of a medium, percentage reflection & refraction at a boundary, impedance matching for transducers, diffraction of sound, principle of a sonar system, sound ranging.

#### **Unit-2**

Fermat's Principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinations. Lagrange equation of magnification, telescopic combinations, telephoto lenses. Monochromatic aberrations and their reductions; aspherical mirrors and Schmidt corrector plates, aplanatic points, oil immersion objectives, meniscus lens. Optical instruments: Entrance and exit pupils, need for a multiple lens eyepiece, common types of eyepieces. (Ramsdon and Hygen's eyepieces).

#### **Unit-3**

Interference of light: The principle of superpositions, two slit interference, coherence requirement for the sources, optical path retardations, Conditions for sustained interference, Theory of interference, Thin films. Newton's rings and Michelson interferometer and their applications its application for precision determinations of wavelength, wavelength difference and the width of spectral lines. Multiple beam interference in parallel film and Fabry-Perot interferometer. Rayleigh refractometer, Twyman-Green interferometer and its uses.

#### **Unit-4**

Diffraction, Types of Diffraction, Fresnel's diffraction, half-period zones, phasordiagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge, Fraunhofer diffraction due to a single slit and double slit, Diffraction at N Parallel slit, Plane Diffraction grating, Rayleigh criterion, resolving power of grating, Prism, telescope.

Polarized light and its mathematical representation, Production of polarized light by reflection, refraction and scattering. Polarization by double refraction and Huygen's theory, Nicol prism, Retardation plates, Production and analysis of circularly and elliptically polarized light. Optical activity and Fresnel's theory, Biquartz polarimeter.

#### **Unit-5**

Laser system: Basic properties of Lasers, coherence length and coherence time, spatial coherence of a source, Einstein's A and B coefficients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser: Ruby and He-Ne laser and. Applications of laser: Application in communication, Holography and Basics of non linear optics and Generation of Harmonic.

#### **TEXT AND REFERENCE BOOKS:**

1. A.K. Ghatak, ' Physical Optics '
2. D.P. Khandelwal, Optical and Atomic Physics ' (Himalaya Publishing House, Bombay, 1988)
3. K.D. Moltev; ' Optics ' (Oxford University Press)
4. Sears: ' Optics '
5. Jenkins and White: ' Fundamental of Optics ' (McGraw-Hill)
6. B.B. Laud: Lasers and Non-linear Optics (Wiley Eastern 1985)
7. Smith and Thomson: ' Optics ' (John Wiley and Sons)
8. Berkely Physics Courses: Vol.-III, ' Waves and Oscillations '

9. I.G. Main,' Vibrations and Waves ' (Cambridge University Press)
10. H.J. Pain:' The Physics of Vibrations and Waves ' (MacMillan 1975)
11. Text Book of Optics: B.K. Mathur
12. B.Sc. (Part III) Physics: Editor: B.P. Chandra, M.P. Hindi Granth Academy.
13. F. Smith and J.H. Thomson, Manchester Physics series: optics (John Wiley, 1971)
14. Born and Wolf:' Optics '.
15. Physical Optics: B. K. Mathur and T. P. Pandya.
16. A textbook of Optics: N. Subrahmanyam, Brijlal and M. N. Avadhanulu.
17. Geometrical and Physical Optics: Longhurst.
18. Introduction to Modern Optics: G. R. Fowels.
19. Optics: P. K. Srivastav.

## B.Sc. – II

### BPHL02: LAB COURSE

#### LIST OF EXPERIMENTS

Minimum 16 (Sixteen) out of the following or similar experiments of equal standard:-

1. Study of Brownian motion.
2. Study of adiabatic expansion of a gas.
3. Study of conversion of mechanical energy into heat.
4. Heating efficiency of electrical kettle with varying voltage.
5. Study of temperature dependence of total radiation.
6. Study of temperature dependence of spectral density of radiation.
7. Resistance thermometry.
8. Thermo emf thermometry.
9. Conduction of heat through poor conductors of different geometries.
10. Experimental study of probability distribution for a two option system using a coloured dice.
11. Study of statistical distribution on nuclear disintegration data (GM counter used as a black box).
12. Speed of waves on a stretched string.
13. Thermal Conductivity of Rubber Using Joule's Calori Meter.
14. Study of interference with two coherent sources of sound.
15. Chlanti's figures with varying excitation and loading points.
16. Measurement of sound intensities with different situation.
17. Characteristics of a microphone –loudspeaker system.
18. Designing and an optical viewing system.
19. Study of monochromatic defects of images.
20. Determining the principle points of a combination of lenses.
21. Study of interference of light (biprism or wedge film).
22. Study of diffraction at a straight edge or a single slit.
23. Study of F – P etalon fringes.
24. Use of diffraction grating and its resolving limit.
25. Resolving limit of a telescope system.
26. Polarization of light by reflection; also  $\cos^2$  law.
27. Calculation of days between two dates of a year.
28. To check if triangle exists and the type of the triangle.
29. Study of optical Polarized light.
30. To solve simultaneous equations by elimination method.
31. To prepare a mark list of polynomials.
32. Fitting a straight line or a simple curve to a given data.
33. Convert a given integer into binary and octal systems and *vi versa*.
34. Inverse of matrix.
35. Spiral array.

**Text and Reference Books:**

1. D. P. Khandelwal; "Optical and Atomic Physion" (Himalaya Publishing House, Bombay 1988).
2. D.P. Khandelwal; "A Laboratory annual for Undergraduate classes" (Vani Publishing House, New Delhi.).
3. S. Lipsechutz and A Poe; "Schaum's Outline of Theory and Problems of programming with fortran"(McGraq – Hill Book Company 1986).
4. Dixon; "Numerical analysis".

### B.Sc. III

## **BPH05: RELATIVITY, QUANTUM MECHANICS, ATOMIC MOLECULAR AND NUCLEAR PHYSICS.**

### **UNIT-I**

Reference system, internal frames, Galilean invariance and conservation laws, propagation of light, Michelson-Morley experiment, search for ether. Postulates for the special theory of relativity, Lorentz transformations, length contraction time dilation, velocity addition theorem, variation of mass –energy equivalence, particle with a zero rest, Compton effect.

### **UNIT-II**

Origin of the quantum theory: failure of classical physics to explain the phenomena such as black-body spectrum, photoelectric effect. Wave-particle duality and uncertainty principle: de Broglie's hypothesis for matter waves: the concept of wave and group velocities, evidence for diffraction & interference of particles, experimental demonstration of matter waves. Davisson and Germer's experiment. Consequence of de Broglie's concepts quantization in hydrogen atom, energies of a particle in a box, wave packets. Consequence of the uncertainty relation: gamma ray microscope, diffraction at a slit.

### **UNIT-III**

Quantum mechanics: Schrodinger's equation postulates of quantum mechanics, operators, expectation values, transition probabilities, application to particle in a one and three dimensional boxes, harmonic oscillator in one dimension, reflection at a step potential, transmission across a potential barrier. Hydrogen atom: natural occurrence of n, l and m quantum numbers the related physical quantities.

### **UNIT-IV**

Spectra of hydrogen, deuterium and alkali atoms spectral terms, doublet fine structure screening constants for alkali spectra for s, p, d and f states, selection rules.

Discrete set of electronic energies of molecules, quantization of vibrational and rotational energies, determination of internuclear distance, pure rotational and rotation vibration spectra. Dissociation limit for the ground and other electronic states, transition rule for pure vibration and electronic vibration spectra. Raman effect, Stokes and anti-Stokes lines, complimentary character of Raman and infrared spectra, experimental arrangements for Raman spectroscopy.

### **UNIT-V**

Interaction of charged particles and neutrons with matter, working of nuclear detectors, G-M counter, proportional counter and scintillation counter, cloud chambers, spark chamber, emulsions. Structure of nuclei, basic properties deuteron binding energy, p-p and n-p scattering and general concepts of nuclear forces. Beta decay, range of alpha particle Geiger-Nuttall law. Gamow's explanation of beta decay, alpha decay, continuous and discrete spectra. Nuclear reactions, channels, compound nucleus, direct reaction (concepts). Shell model & liquid drop model, fission and fusion (concepts), energy production in stars by p-p and carbon cycles (concepts).

**Text and Reference Book:**

1. H.S. Mani and G.K. Metha: "Introduction to Modern Physics" (Affiliated East-West press, (1989)
2. A Beiser, "prospective of Modern Physics"
3. H.E. White, Introduction to Atomic physics.
4. Barrow, "Introduction to Molecular physics"
5. R.P.Feymann, R.B.Leighton and M Sands "the Feynann Lectures on Physics", Vol.III (B.I.Publications, Mumbai, Delhi, Kolkata, Chennai).
6. T.A.Littlefield and N thorley, "Atomic and Nuclear Physics" (engineering Language Book Society)
7. H.A.Enge. "Introduction to Nuclear Physics"(Addision-Wesly)
8. Eisenberg and Resnik "Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles" (John Wiley)
9. D.P.Khandelwal. "optics and Atomic Physics" (Himalaya Publising house, Mumbai.(1988).

**B.Sc. III**  
**BPH06: SOLID STATE PHYSICS, SOLID STATE DEVICES AND**  
**ELECTRONICS**

Max.Marks-50

**UNIT-I**

Amorphous and crystalline solids, elements of symmetry, Seven System, Cubic lattices, Crystal planes, miller indices, Laue's equation for X-ray diffraction, Bragg's law, Bonding in solids classification. Cohesive energy of solid. Madelung constant, evaluation of parameters. Specific heat of solids, classical theory (Dulong-petit's law). Einstein and Debye theories. Vibration modes of one-dimensional monoatomic lattice, Dispersion relation, Brillouin zone.

**UNIT-II**

Free electron model of a metal solution of one dimensional "Schrodinger equation in a constant potential. Density of states. Fermi Energy. Energy bands in solid Kroning penny modal (without mathematical detail). Metals, insulator and semiconductors. Hall effect. Dia, Para and ferromagnetism.langevin's theory of dia and para-magnetism. Curieweiss's law. Qualitative description of ferromagnetism (magnetic domains) B-H.curve and Hysteresis loss.

**UNIT-III**

Intrinsic semiconductor, carrier concentration in thermal equilibrium, Fermi level, impurriy, doped semiconductor, doner and acceptor levels, Diode equation, junction breakdown, Depletion width and junction capacitance, abrupt junction breakdown, Tunnel diode, Zener diode. Light emitting diode, solar cell, Bipolar transistors, pnp and npn transistors, characteristics of transistors, different configuration, current amplification factor, FET.

**UNIT-IV**

Half and full wave rectifier, efficiency, ripple factor, Filters, Inductor filter, Tand  $\pi$  filters, Zener diode, regulated power supply.Applications of Transistors. Bipolar Transistor as amplifier. Single stage and CE small signal amplifiers, Emitter follower, transistor power amplifier, Transistor as oscillator, Wein-Bridge and Hartley oscillator.

**UNIT-V**

Introduction to computer organization, time-sharing and multi programming systems, window base word-processing packages, MS word. Introduction to C programming and application to simple problems of arranging numbers in ascending/descending order: sorting a given data in an array, solution of simultaneous equation.

**BOOK RECOMMENDED:**

1. Introduction to solid state physics: C.Kittel
2. solid State Physice :A.J.Dekker
3. Electronic Circuits :Mottershesd
4. Electronic Circuits : Millman and Halkinas
5. Semiconductor Devices :S.M.Sze
6. Computer Fundamental :Balaguara Swami

**B.Sc. III**  
**BPHL03: LAB COURSE**

Max.Marks-50

**LIST OF EXPERIMENTS**

MINIMUM 16 (Sixteen) out of following or similar experiment of equal standard:

1. Determination of Planck's constant.
2. Determination of  $e/m$  by using Thomson's tube.
3. Determination of  $e$  by Millikan's methods.
4. Study of spectra of hydrogen and deuterium ( Rydberg constant and ratio of masses of electron proton )
5. Absorption spectrum of iodine vapour.
6. Study of alkali or alkali or earth spectra using a concave gra's.
7. Study of Zeeman effect for determination of Lande g-factor.
8. Analysis of given band spectrum.
9. Study of Raman spectrum using laser as an excitation source.
10. Study of absorption of alpha and beta rays.
11. Study of statistics in radioactive measurement
12. Coniometric study of crystal faces.
13. Determination of dielectric constant.
14. Hysteresis curve of transformer core.
15. Hall-probe method for measurement of magnetic field.
16. Specific resistance and energy gap of a semiconductor.
17. Characteristics of PNP transistor.
18. Characteristics of NPN transistor
19. Characteristics of tunnel diode.
20. Study of voltage regulation system.
21. Study of a regulated power supply.
22. Study of lissajous figures using CRO.
23. Study of VTVM.
24. Study of RC and TC coupled amplifiers.
25. Study of AF and RF oscillators.
26. Find roots of  $F(X)=0$  by using Network-Raphson method.
27. Find roots of  $F(X)=0$  by using secant method.
28. Integration by Simpson rule.
29. Finding first four perfect numbers.
30. Quaddratic interpolation using Network's forward-difference formula of degree two.
31. C.Programming
  1. To write a program for simple interest.
  2. To write a program to print two numbers.
  3. To write a program to print numbers in ascending order.
  4. To write a program to print numbers in Descending order.
  5. To write a program to insert three numbers and find out the largest one.

6. To write a program to insert an integer numbers and find out even or odd numbers.
7. To write a program for finding simple interest for three set of Capital rate, rate of percentage and years.

**TEXT AND REFFERANCE BOOKS:**

1. B.G.Strecj,am: “solid state electronic devices” II Edition (Prentice-Hall of India, New Delhi,1986)
2. W.D. Stanley; “Electronic devices, circuits and applications” (Prentice Hall, New jersey, USA 1988)
3. S.Lipschutz A Poe; Schum’s Outline of theory and problems of programming with Fortran” (McGraw-hall Book Co.Singapore 1986)
4. C.Dixon; “Numerical Analysis.